

## Remarks/Arguments

### **Rejections under 35 U.S.C. § 102**

In the Office Action, the Examiner rejected claims 1, 2, 3, 5 and 8 under 35 U.S.C. § 102(b) as being anticipated by U.S. Patent No. 6,476,498 to Amit P. Marathe ("*Marathe*"). Applicants respectfully request reconsideration of this rejection for at least the following reasons.

As to claim 1, claim 1 has been amended to recite, among other things, "a damascene interconnect structure defined in the dielectric layer, the damascene interconnect structure having a bottom portion not coupled to a conductive channel; and a barrier layer deposited over the dielectric layer and within the damascene interconnect structure, the barrier layer within the damascene interconnect structure being tapered." Underline added. *Marathe* does not disclose such a feature.

In particular, the Examiner in the Office Action cites FIG. 3 of *Marathe* as allegedly showing a tapered barrier layer within a damascene interconnect structure. However, the allegedly "tapered" barrier layer 132 of FIG. 3, which the Applicants dispute as being "tapered," is within an interconnect structure (i.e., a via 206) that has a bottom portion that is **coupled to a conductive channel** (i.e., channel 202). Therefore, *Marathe* **does not** disclose "a damascene interconnect structure defined in the dielectric layer, the damascene interconnect structure **having a bottom portion not coupled to a conductive channel**."

Furthermore, one would **not** be motivated to modify the interconnect structure (i.e., the via 206 as shown in FIG. 3) as taught in *Marathe* such that the bottom portion of the interconnect structure would not be coupled to a conductive channel (channel 202) since **the premise** of using a thicker barrier layer (and not tapered), as taught in *Marathe*, is to **prevent void nucleation near the via/channel interface** as depicted in FIG. 2 of *Marathe*. See col. 3, lines 18-40, col. 4, lines 56-67, and FIG. 2. Thus, if there were no via/channel interface then there would be no motivation to have a thicker

(or tapered) barrier layer in the interconnect structure (i.e., via) as taught in *Marathe*. For at least these reasons, claim 1 is patentable over *Marathe*.

Claims 2, 3, 5, and 8 depend from and add additional features to independent claim 1. Therefore, by virtue of their dependency, these claims are also patentable over *Marathe*.

### **35 U.S.C. § 103 Rejection**

The Examiner rejected claim 4 under 35 U.S.C. § 103(a) as being unpatentable over *Marathe* in view of U.S. Patent No. 6,566,250 to Tu et al. ("*Tu*") or U.S. Patent No. 5,592,024 to Aoyama et al. ("*Aoyama*"). Applicants respectfully request reconsideration of this rejection for at least the following reason.

Claim 4 depends from and adds additional features to independent claim 1. The deficiencies of *Marathe* as described above are not overcome by the teachings of *Tu* and/or *Aoyama*. Therefore, for at least this reason, claim 4 is patentable over *Marathe* in view of *Tu* or *Aoyama*.

The Examiner rejected claims 5-8 under 35 U.S.C. § 103(a) as being unpatentable over *Marathe* in view of U.S. Patent Application Pub. No. 2002/0024150 to Paul A. Farrar ("*Farrar*"). Applicants respectfully request reconsideration of this rejection for at least the following reason.

Claims 5-8 depend from and add additional features to independent claim 1. The deficiencies of *Marathe* as described above are not overcome by the teachings of *Farrar*. Therefore, for at least this reason, claims 5-8 are patentable over *Marathe* in view of *Farrar*.

The Examiner rejected claims 21-24 under U.S.C. § 103(a) as being unpatentable over *Marathe* in view of *Farrar* and U.S. Patent Application Pub. No. 2002/0184490 to McCown et al. ("*McCown*"). Applicants respectfully request reconsideration of this rejection for at least the following reason.

As for independent claim 21, claim 21 has been amended to include similar features as amended independent claim 1. The deficiencies of *Marathe* as described above are not overcome by the teachings of *Farrar* and/or *McCown*. Therefore, for at least this reason, claim 21 is patentable over *Marathe* in view of *Farrar* and *McCown*.

Claims 22-24 depend from and add additional features to independent claim 21. Therefore, by virtue of their dependency, these claims are also patentable over *Marathe* in view of *Farrar* and *McCown*.

### Conclusion

In view of the foregoing, the Applicants respectfully submit that claims 1-8 and 21-24 are in a condition for allowance. Early issuance of Notice of Allowance is respectfully requested.

If the Examiner has any questions, he is invited to contact the undersigned at (503) 796-2099.

The Commissioner is hereby authorized to charge shortages or credit overpayments to Deposit Account No. 500393.

Respectfully submitted,  
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Dated: 10/1/05

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